

# KARANDIKAR LABORATORIES PVT. LTD. BOISAR

Format: F#07 b.1 Rev 10

## TYPE TEST REPORT IS/IEC 60529:2001(RA 2019)

### Degrees of Protection Provided by Enclosures (IP Code)

Report No. .... : KLPL/BTG/23/03-03

ULR No. .... : TC631123000000XXXXF

Discipline ..... : Electrical Discipline

Group/Category ..... : Environmental Test Facility

Sub-category ..... : Ingress protection test

Date of issue..... : 30.03.2023

No. of pages ..... : 06 PAGES + Annexure

Compiled by (+ signature)..... : Rohit Patil

Designation: Testing Engineer

Approved by (+ signature)..... : Vikrant Raut

Designation: Sr. Testing Engineer

Item Received On ..... : 02.03.2023 in Good Condition

Test Completion Date ..... : 20.03.2023

#### Client

Name ..... : M/s. Kaustubha Udyog

: Survey No.36/1/11, Sinhadga Road, Vadgaon Khurd,  
Near Lokmat Press, Pune-411041.

#### Test Specification

Standard ..... : IS/IEC 60529:2001(RA 2019)

Specified IP-Code ..... : IP68

#### Equipment Under Test

Type of Test Object ..... : Pressure Switch

Model No. .... : MZ Series

Sr. No..... : A23025673

Manufacturer ..... : M/s. Kaustubha Udyog

#### Annexure :

Drawing No..... : A36 GA 088, Rev.No.01, Dated:25.03.2023, (01 Page)

**NOTE :** 1) This refers only to the particular item(s) submitted for testing.  
2) If necessary, this report shall be reproduced ONLY in full.





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Report No.: KLPL/BTG/23/03-03

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**Possible test case verdicts:**

Test case does not apply to the test object ..... : N ( Not Applicable)

Test object does meet the requirement..... : P ( Pass)

Test item does not meet the requirement ..... : F (Fail)

Test case has not been checked ..... : \_\_\_\_\_

**General remarks:**

"(See remark #)" refers to a remark appended to the report.

"(See appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

The test results presented in this report relate only to the object tested.

This test report shall not be reproduced except in full without the written approval of the testing Laboratory.

IP6X test conducted at Laboratory (Boisar).

IPX8 test conducted at Laboratory (Boisar).

**Note: - MAJOR EQUIPMENTS USED**

| Tests   | Required Instruments | Id. No.       | Cal Due Date | Used Y/N |
|---------|----------------------|---------------|--------------|----------|
| 5X / 6X | Vacuum Meter         | K&A 1108/1-17 | 31.01.2024   | Y        |
|         | Rotameter            | K&A 426       | 05.01.2024   | Y        |
|         | DTC with sensor      | K&A 581/2-12  | 06.08.2023   | Y        |
|         | Timer                | K&A 581/1-12  | 08.08.2023   | Y        |
| X7 /X8  | Scale                | K&A 430-13    | 21.10.2023   | Y        |
|         | Stop watch           | K&A 1171-18   | 07.10.2023   | Y        |





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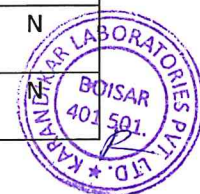
Report No.: KLPL/BTG/23/03-03

Date: 30.03.2023

## IS/IEC 60529:2001(RA 2019)

| Clause      | Requirement - Test                                                                                                                                                                                             | Result- Remark     | Verdict |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------|
| <b>10</b>   | <b>Marking.</b>                                                                                                                                                                                                | --                 | N       |
| <b>11</b>   | <b>General requirement for tests.</b>                                                                                                                                                                          |                    |         |
| <b>11.1</b> | Tests should be carried out under the standard atmospheric conditions described in IEC 60068-1                                                                                                                 | Followed           | P       |
| <b>11.2</b> | Test samples shall be in a clean and new condition.                                                                                                                                                            | Sample found clean | P       |
|             | The relevant product standard shall specify details such as: The number of samples to be tested;                                                                                                               | One                | N       |
|             | -conditions for mounting, assembling and positioning of the samples;                                                                                                                                           | Vertical           | P       |
|             | -the pre-conditioning, if any, which is to be used;                                                                                                                                                            | --                 | N       |
|             | -whether to be tested energized or not;                                                                                                                                                                        | --                 | N       |
|             | -whether to be tested with its parts in motion or not;                                                                                                                                                         | Non-Operational    | N       |
| <b>11.5</b> | <b>Empty enclosures</b>                                                                                                                                                                                        |                    |         |
|             | If the enclosure is tested without equipment inside, the manufacturer shall ensure that after the electrical equipment is enclosed the enclosure meets the declared degree of Protection of the final product. | --                 | N       |

|                                |                                                                                                                 |                |                                                   |    |   |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------|----|---|
| <b>12</b>                      | <b>Tests for protection against access to hazardous parts indicated by the first characteristic numeral.</b>    |                |                                                   |    |   |
| First, characteristic Numeral. | Test means (Access probes)                                                                                      | Test force     | Test Conditions Refer IS/IEC 60529:2001 (RA 2019) | -- |   |
| 0                              | No test required                                                                                                | -              | -                                                 | -- | N |
| 1                              | The access probe, sphere of 50 mm $\varnothing$ shall not fully penetrate and adequate clearance shall be kept. | 50N $\pm 10\%$ | Cl.12.2                                           | -- | N |
| 2                              | The jointed test finger may penetrate up to 80 mm length but adequate clearance shall be kept.                  | 30N $\pm 10\%$ | Cl.12.2                                           | -- | N |
| 3                              | The access probe, sphere of 2.5 mm $\varnothing$ shall not penetrate and adequate clearance shall be kept.      | 3N $\pm 10\%$  | Cl.12.2                                           | -- | N |
| 4                              | The access probe of 1,0 mm $\varnothing$ shall not penetrate and adequate clearance shall be kept.              | 1N $\pm 10\%$  | Cl.12.2                                           | -- | N |
| 5                              | Test conditions for IP 5X: Same As Above                                                                        | 1N $\pm 10\%$  | Cl.12.2                                           | -- | N |
| 6                              | Test conditions for IP 6X: Same As Above                                                                        | 1N $\pm 10\%$  | Cl.12.2                                           | -- | N |



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**IS/IEC 60529:2001(RA 2019)**

| Clause | Requirement – Test | Result-Remark | Verdict |
|--------|--------------------|---------------|---------|
|--------|--------------------|---------------|---------|

|                                |                                                                                                                                                                                          |             |                                                   |                                                                                              |   |
|--------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------------------------------------------|----------------------------------------------------------------------------------------------|---|
| <b>13</b>                      | <b>Tests for protection against solid foreign objects indicated by the First characteristic numeral.</b>                                                                                 |             |                                                   |                                                                                              |   |
| First, characteristic Numeral. | Test means (object probes and dust chamber)                                                                                                                                              | Test force  | Test Conditions Refer IS/IEC 60529:2001 (RA 2019) | --                                                                                           |   |
| 0                              | No test required                                                                                                                                                                         | -           | -                                                 | --                                                                                           | N |
| 1                              | Rigid sphere without handle or guard 50 mm diameter.                                                                                                                                     | 50N<br>±10% | Cl.13.2                                           | --                                                                                           | N |
| 2                              | Rigid sphere without or guard 12, 5 mm diameter.                                                                                                                                         | 30N<br>±10% | Cl.13.2                                           | --                                                                                           | N |
| 3                              | Rigid steel rod 2,5mm diameter with edges free from burrs                                                                                                                                | 3N±<br>10%  | Cl.13.2                                           | --                                                                                           | N |
| 4                              | Rigid steel wire 1, mm diameter with edges free from burrs.                                                                                                                              | 1N±<br>10%  | Cl.13.2                                           | --                                                                                           | N |
| 5                              | Dust chamber, with under pressure                                                                                                                                                        | NA          | Cl.13.4+13.5                                      | --                                                                                           | N |
| 6                              | Dust chamber, The enclosure is maintained below the Surrounding atmospheric pressure by a vacuum pump.                                                                                   | NA          | Cl.13.4+13.6                                      | For 8 hrs. as extraction rate is less than 40 Volumes per hour and max depression of 20mbar. | P |
| 13.6.2                         | <b>Acceptance conditions for the first characteristic numeral 6X.</b><br>The protection is satisfactory if no hazardous deposit of dust is observable inside the UUT at the end of test. |             |                                                   | No ingress of powder found inside the UUT.                                                   | P |



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| IS/IEC 60529:2001(RA 2019)                                                                                                                                                                                                                                              |                                                                                                                                                                                                                  |                                                      |                                                                      |         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|----------------------------------------------------------------------|---------|
| Clause                                                                                                                                                                                                                                                                  | Requirement – Test                                                                                                                                                                                               |                                                      | Result-Remark                                                        | Verdict |
| <b>14</b>                                                                                                                                                                                                                                                               | <b>Tests for protection against water indicated by the second characteristic numeral.</b>                                                                                                                        |                                                      |                                                                      |         |
| Second, characteristic Numeral.                                                                                                                                                                                                                                         | Test means                                                                                                                                                                                                       | Test Conditions<br>Refer IS/IEC 60529:2001 (RA 2019) | --                                                                   |         |
| 0                                                                                                                                                                                                                                                                       | No test required                                                                                                                                                                                                 | Cl.14.2.0                                            | --                                                                   | N       |
| 1                                                                                                                                                                                                                                                                       | Drip box, Enclosure on turntable                                                                                                                                                                                 | Cl.14.2.1                                            | --                                                                   | N       |
| 2                                                                                                                                                                                                                                                                       | Drip box, Enclosure in 4 fixed positions of 15 ° tilt                                                                                                                                                            | Cl.14.2.2                                            | --                                                                   | N       |
| 3                                                                                                                                                                                                                                                                       | oscillating tube or spray nozzle, 60° from vertical                                                                                                                                                              | Cl.14.2.3                                            | --                                                                   | N       |
| 4                                                                                                                                                                                                                                                                       | oscillating tube or spray nozzle, 180° from vertical                                                                                                                                                             | Cl.14.2.4                                            | --                                                                   | N       |
| 5                                                                                                                                                                                                                                                                       | 6.3-mm nozzle, tested with a spraying nozzle, distance 2.5 m to 3 m, water flow rate 12.5 l/min                                                                                                                  | Cl.14.2.5                                            | --                                                                   | N       |
| 6                                                                                                                                                                                                                                                                       | 12.5-mm nozzle, tested with a spraying nozzle, distance 2.5 m to 3 m, water flow rate 100 l/min                                                                                                                  | Cl.14.2.6                                            | --                                                                   | N       |
| 7                                                                                                                                                                                                                                                                       | Immersion tank,                                                                                                                                                                                                  | Cl.14.2.7                                            | --                                                                   | N       |
| 8                                                                                                                                                                                                                                                                       | Immersion tank,<br>Continuous immersion subject to agreement.<br>Water temperature does not differ from that of equipment by more than 5K. <b>Test Duration:08 hrs</b>                                           | Cl.14.2.8                                            | The lowest point of UUT is located 1.5 meter below surface of water. | P       |
| -                                                                                                                                                                                                                                                                       | <b>Acceptance conditions for IPX8:</b><br>The protection is satisfactory if no water has accumulated near the insulation, cable end or entered cables or interferes with the correct operation of the equipment. | Cl.14.3                                              | No ingress of water observed inside the UUT.                         | P       |
| -                                                                                                                                                                                                                                                                       | Tests for protection against access to hazardous parts indicated by the additional letter.                                                                                                                       | Cl.15                                                | --                                                                   | N       |
| <b>SUMMARY OF INGRESS PROTECTION TESTS ACCORDING TO IS/IEC 60529:2001(RA 2019)</b><br><b>Conclusion of the IP68 test: Pass.</b><br>The results of the tests does not compliance with the requirements in the standard IS/IEC 60529:2001(RA 2019)<br>UUT=Unit Under Test |                                                                                                                                                                                                                  |                                                      |                                                                      |         |



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**Picture1:** Pressure Switch

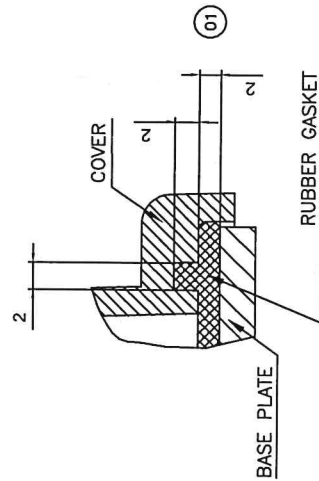
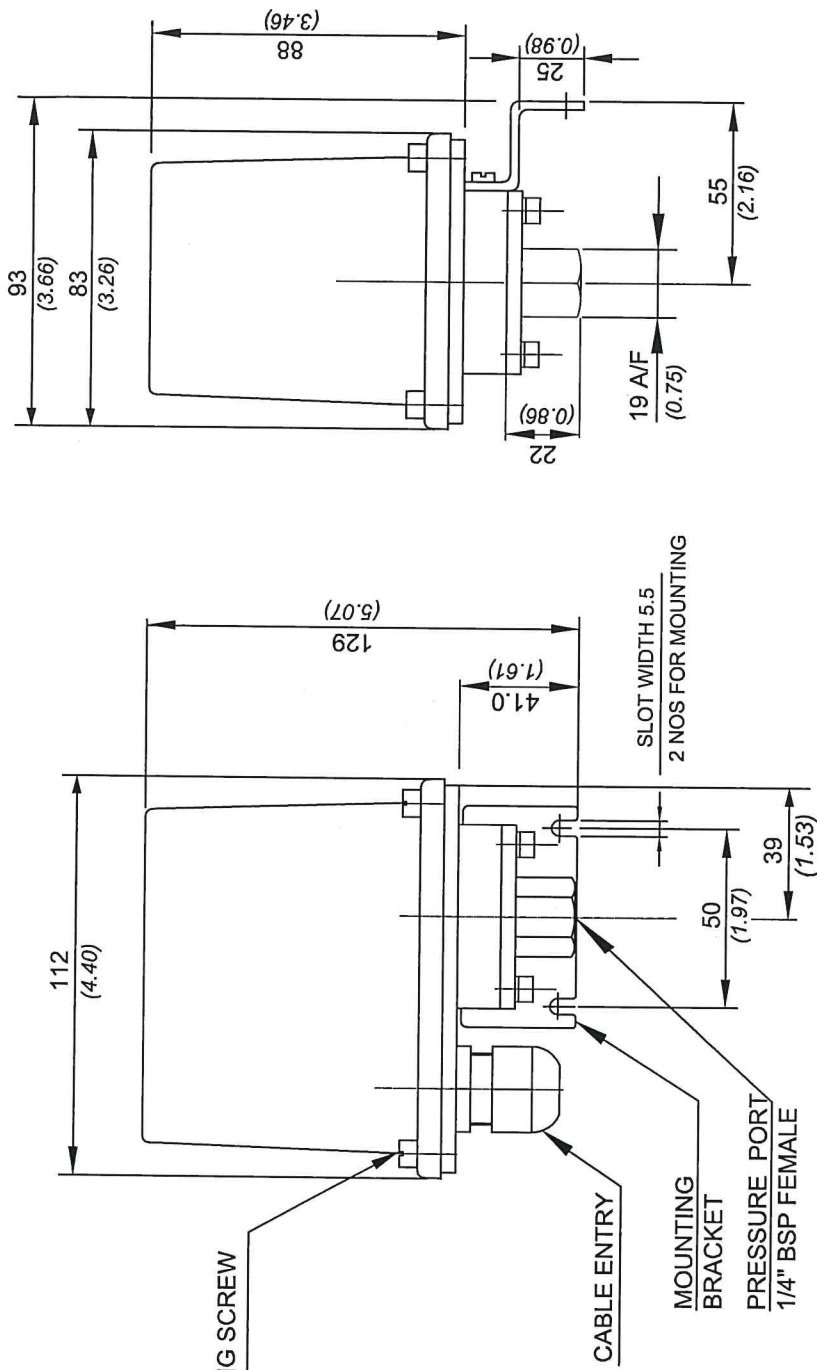


**Picture2:** No ingress of powder & water observed



**END OF REPORT**





TYPICAL CROSS SECTION AT COVER  
SCALE - 4:1

Enclosure Volume : 570 cm<sup>3</sup>

Weight of the switch : 1.1 Kg. Approx.

INGRESS PROTECTION TEST AS PER : IS/IEC 60529-1 FOR IP 68

NAME OF LAB : Karandikar Laboratories Private Limited  
MODEL CODE : MZ SERIES  
SERIAL NO. :



Report No-KLP2/BG/23/03-03

APPROX. DIMENSIONS IN mm (inches)

|                                  |                     |          |          |
|----------------------------------|---------------------|----------|----------|
| MATERIAL : -                     | APPRVD. BY          | RAM      | 20/02/23 |
| TREATMENT :                      | CHECKED BY          | UDK      | 20/02/23 |
| TITLE : GA DRAWING for IP68 TEST | DRAWN BY            | KGM      | 20/02/23 |
| DATE                             | SIGN.               |          |          |
| 01 Gasket details added          | DATE                | 25/03/23 |          |
| LC.No. CHANGES MADE              |                     |          |          |
| THIRD ANGLE                      |                     |          |          |
| MODEL: A36 MZ SERIES             | SHEET No.: 1 OF 1   | SCALE    | NTS      |
| KAUSTUBHA UDYOG                  | DRG.NO.: A36 GA 088 | L.C.No.  | 01       |
| PUNE - 411030 INDIA              |                     |          |          |

D:\KAD\Development\MZ\A36 GA 088 - GA drawing for IP68 Ingress protection